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Measuring Entrepreneurs' Social Networks and their Economic Impact in African Informal Economy

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Abstract

Social relations and networks constitute a major form of social regulation in urban African informal economy. Their nature, configuration and impact on entrepreneurs' economic performances represent a crucial issue for policy intervention. In order to explore the subject this paper focuses on entrepreneurs' social or personal network instead of inter-firms linkages. Indeed, observed networks go through usual frontiers of social institution and categories. We thus propose an 'ego-centred' network perspective which is particularly relevant to study informal entrepreneurs' networks that are often composed of a mixture of business, friendship and kinship ties. Such an approach allows to measure social networks according to three salient dimensions: network structure (size, density), content of ties (strength, social role, exchanged resources), and members' attributes (sociodemographic, social status, professional occupation). From an empirical standpoint we use an original dataset collected in 2007 on a representative sample of 317 entrepreneurs in the informal economy of Bobo-Dioulasso (Burkina Faso). The 'multiple name generators' instrument implemented to collect 'ego-centred' network data produces a rich set of information describing social networks' configuration according to their three dimensions. Quantitative measures of networks' structure and composition allow to produce well-informed typology of entrepreneur's social networks. Multiple regression analysis then shows that linking networks with members enjoying privileged social status have no significant impact on entrepreneurs' economic performances. Conversely, solidarity networks have a significant positive impact. Moreover, business ties and business networks also have an impact, but not anyhow. The differentiated impacts of flexible and dense business networks suggest the need for institutions encouraging equitable interactions between entrepreneurs and moderating social constraints.

1. Introduction

Described as an extremely heterogeneous collection of activities, partly conducted on the fringe of state rules, informal economy has shown rapid expansion in developing countries during the last decades, especially in urban African cities where it contributes on average to 61% of employment (Xaba and al., 2002). In this context, understanding informal dynamics represents a crucial issue for policy intervention. One little-known aspect of these dynamics is the role of social networks as a major form of social regulation.

The role of social networks in markets and economic action, outcomes and institutions is recognized and has been studied for long time by social scientists, notably sociologists (Granovetter, 1985; Coleman, 1988). Economists also recently picked up this problematic, notably by demonstrating the role of social networks in market efficiency and the reduction of

transaction costs (Kranton, 1996). Obviously, such a subject as social networks favors cross-fertilization among social sciences. In African societies, the nature and role of social networks have been widely studied by anthropologists, historians and sociologists, notably concerning wide trading networks from pre-colonial to contemporary periods (Mitchell, 1969; Cohen, 1969, Meillassoux, 1971). In the current framework of urban informal economy, and in an African context of states and modern institutions failure, social networks and personal relations inevitably play an important part in structuring economic activities. Indeed, they may facilitate access to diverse useful resources for entrepreneurs, as for example information, ideas and knowledge (about markets, activities, and skills) or financial and material support (notably in time of crisis). Regarding informal activities, it is of special importance as it compensates for the weakness of small firms internal resources.

From an economic standpoint, the study of contemporary social networks in urban entrepreneurship and informal economy has been constructed within two interrelated perspectives (Barr, 2002; Knorringa and van Staveren, 2006). The first relates to the analysis of inter-firm networks in industrial sectors or clusters in developing countries (McCormick, 1999; Brautigam, 1997, Meagher, 2007). The second rests on the social capital literature and focuses on entrepreneurs' social networks. It attempts to evaluate their nature, role and impact on entrepreneurial success and economic performances. However, quite surprisingly, this perspective remains few developed as most of the empirical literature about individual social capital in developing countries focuses on household level rather than entrepreneur one (see, for example, the literature review of Durlauf and Fafchamps, 2004). Moreover, the concept of social capital does not exclusively refer to social networks, but also to social norms and trust. Nevertheless, as Durlauf and Fafchamps (2004: 46, 57) argue, it may be more fruitful for empirical analysis to 'step back from grandiose approaches' and focus on some specific social components of social capital like social networks. That is the reason why our approach is firmly rooted in this second perspective and specifically focuses on social networks[1]. However, another important difficulty of such perspective, that probably explains its lack of empirical investigations, rests on the ability to measure and collect exploitable data on social networks.

Our paper contributes to the literature on entrepreneurs' social networks by analyzing and evaluating their economic impact in the informal economy of Bobo-Dioulasso (the second city of Burkina Faso). More precisely, it challenges one of its main difficulties that rest on social networks' measurement and data collection. We thus propose an approach based on the notion of 'ego-centred network' that partly draws on the Social Network Analysis (SNA) research tradition (Wasserman and Faust, 1994; Scott, 2000). An 'ego-centred' (or 'personal') network is defined as one actor's set of connections with others (Wellman, 2007a). This perspective is particularly relevant to study informal entrepreneurs' social networks that are often composed of a mixture of business, friend and kin ties. Network is thus defined as entrepreneurs' regular social relations conveying essential resources for activities' current exploitation. Such an approach allows to describe social network's configuration according to three salient dimensions: network structure (size, density), content of ties (strength, social role, exchanged resources), and members' attributes (sociodemographic, social status, professional occupation). As it necessitates specific personal networks data (Wellman, 2007b), we consequently conducted an original survey on a representative sample of 317 Bobo-Dioulasso's entrepreneurs from February to July 2007. In addition to socio-demographic and economic data, personal networks data have been collected on a sub-sample

[1] In addition, due to conceptual vagueness, coexistence of multiple definitions, and intense debate in the literature concerning the concept of 'social capital' (Durlauf and Fafchamps, 2004), we will only refer to the notion of 'social network' in our approach.

of 278 entrepreneurs. That part of the questionnaire is based on an adaptation of the multiple names generators method (Fischer, 1982; Burt, 1984; Campbell et Lee, 1991; Marsden, 2005). The explanatory power of this approach rests on its ability to produce rich statistical information about the complex nature of informal entrepreneurs' networks in regard to the three above-mentioned dimensions. Quantitative measures of networks composition and structure are then computed. They permit to produce a well-informed typology of entrepreneurs' social networks which is used to test and discuss the relevance of networks' configuration as a predictor of entrepreneurs' economic outcomes.

This paper is organized as follows. After a brief overview of social networks' measurement problems in the literature about African informal economy, section 2 presents the ego-centred network framework. Section 3 reviews the alleged impact of the three dimensions of ego-centred network on entrepreneurs and firms' economic performances. Data, survey methodology, especially the multiple names generators instrument, and measurement options are discussed in section 4. Section 5 proposes a typology of entrepreneurs' social networks and then tests the potential effects of the different networks configurations on informal entrepreneurs' outcomes. Finally, discussion and concluding remarks are presented in section 6.

2. Entrepreneurs' social networks in African informal economy: a framework for measurement

There are two interrelated strands in the literature about social networks and African entrepreneurship that have evolved quite separately until the late 1990s (Barr, 2002; Knorringa and van Staveren, 2006). The first relates to the analysis of inter-firm networks in industrial sectors or clusters in developing countries. The second relies on the social capital literature. After a brief overview of the linkages between these two corpuses, we discuss the way authors apprehend the concrete measure of entrepreneur's social networks. We then support the argument that ego-centred network constitutes an appropriate framework for measurement.

Inter-firm networks vs. entrepreneurs' social networks

Literature about inter-firms networks attempts to analyze the role of industrial clusters in Africa's industrialization and development. It notably questions the significant lack of industrial clusters in Africa (McCormick, 1999). The core idea is that clusters, or inter-firms networks in industrial sector, may permit small and micro-enterprises to overcome growth constraint by the so-called 'collective efficiency'. One dimension of collective efficiency, named 'active' or 'planned' efficiency, rests on firms' linkage and entrepreneurial networks. Nadvi and Schmitz (1994) argue that collective efficiency in clusters depends on dense cooperative networks embedded in local socio-cultural relations. For example, Brautigam (1997, 2003) demonstrates the positive role of ethnic business networks in the industrial dynamics of Nigeria and Mauritius. Conversely, Meagher (2006, 2007) stresses that in times of economic crisis, increasing competition and state neglect, social networks and their organizational capacity tend to be disintegrated or fragmented. She adds that such effects may lead to the collapse of entire industrial clusters in African informal economies. Thus, by exploring the role of entrepreneurs' social networks as a possible support of industrial sectors and clusters, connection is made with the second strand of literature focused on social capital. This one attempts to identify and analyze the nature and types of networks in which entrepreneurs are embedded (not only for clustered enterprises). Then, it evaluates their role and impact on entrepreneurial success and economic performances in African economies

(Fafchamps and Minten, 2002a, b; Barr, 2002). Whereas the first approach is mostly based on sectoral level analysis and relies on qualitative surveys, the second produces quantitative measure of individual firms or entrepreneurs' social networks[2].

The problem of measuring entrepreneurs' social networks

Two main social networks' measures have been proposed in the framework of social capital literature. It is common to use entrepreneurs' membership in various (formal or informal) organizations, groups, clubs and communities (as business communities or ethnic groups for example, see Fafchamps, 2000; Knorringa and van Staveren, 2006). However, these measures are likely to ignore the less formalized relations developed outside organizations and social groups, which have an important role, notably in the formation of trust (Lyon, 2000). Yet, the main function of social networks is precisely to go through frontiers of institutions and constituted groups. As suggested by Mitchell (1969:49): 'Social networks ramify across and between institutions'. Moreover, membership of identity-communities (as ethnic groups) is also problematic in contemporary urban Africa. Indeed, economic pressure and urbanization tend to encourage the decoupling of interpersonal relations, within and outside communities, and to favour the development of more personalized networks (Lourenço-Lindell, 2002; Meagher, 2006). Consequently, the second measure focuses on entrepreneurs' inter-personal relationships, and notably business relationships (Fafchamps and Minten, 2001, 2002a, b; Barr, 2002). It is, in concrete terms, based on the number of social links a firm owner maintains with some category of agents. Fafchamps and Minten (2002a, b), in their studies of social capital in Madagascar's agricultural trade, use five measures: the number of relatives in agricultural trade, the number of traders known, the number of people who can help financially, the number of suppliers and clients known personally. Actually, most measures essentially focus on the number of contacts an entrepreneur keeps going in the business or market sphere. However, as Barr (2000) and Fafchamps (2001) have quite rightly pointed out, relations with agents outside market may also be useful. Therefore, Barr (2002), in her studies of Ghanaian entrepreneurs, measures social network through the number of contacts they maintain with six categories referring to business relations and three categories referring to privileged social categories outside business sphere (bankers, public servants and politicians). But even though such studies provide some useful general insights on social networks and African entrepreneurial dynamics (see section 3), we consider that it still rest on unconvincing proxies for entrepreneurs' social networks. Three major flaws shall be considered. First, the focus on the 'number' of contacts may disembed personalized relations from their social context. Indeed, these measures essentially depend on network size and give little qualitative information about the complex nature of social ties and network's structure. Of course, contacts' social group bears some information but here lies the second limit. Such categories are pre-defined and it is thus quite risky to predict what type of social group is useful for entrepreneurs before having demonstrated it. In addition, important ties maintained by entrepreneurs outside these categories could be missed[3]. This method may so be unsuitable to capture the multidimensional nature of entrepreneur's network. The last point is about the social relation definition. In fact, to 'know' someone does not necessarily mean that the

[2] One exception is the work of Knorringa and van Staveren (2006) that connects social capital literature with industrial development (see also van Staveren and Knorringa, 2007). However, in their two case studies about the footwear industry in Ethiopia and Viet Nam, measure of entrepreneurs' social capital rest only partly on networks, as they also consider estimations of trust (general level of trust and specific contextual trust).

[3] For example, Barr (2002) asked entrepreneurs how many of their contacts would they expect to receive help in time of crisis. Perhaps one could answer 'none of them!' But in fact, he receives help from another persons that doesn't belong to any of the predefine categories. This method thus missed important ties that permit an entrepreneur to face crisis and maintain his business.

entrepreneur can get resources from this person when necessary (financial support in time of personal crisis for example). It's just a 'potential' social support tie. Moreover, to 'know' someone is not an unequivocal criterion and it is likely to be interpreted quite differently among entrepreneurs. As a result, we suggest that in order to produce richer and relevant quantitative measure of entrepreneur's social networks, it may be fruitful for economists to be inspired by the social network analysis (SNA) tradition of the sociologists and their methodological toolkit (Borgatti and al., 1998; Van Der Gaag and Snijders, 2003).

Entrepreneurs' ego-centred network framework

The use of SNA to study economic action, outcomes and institutions has known considerable expansion since Granovetter's (1985) seminal paper on 'structural embeddedness'. This literature rests on the legacy of different research traditions but is the first to formalize the social network notion in a quantitative approach (Wasserman and Faust, 1994; Scott, 2000)[4]. Generally speaking social relations between individuals are commonly viewed in this frame as inter-personal experience based on interactions that permit resources' transmission. Then, a social network is just considered as the aggregation of social relations. SNA rests on two methodological corpuses. In the first one, social network is defined from a socio-centered standpoint as a finite set of actors and the relations between them (Wasserman and Faust, 1994: 20). It is called 'whole' or 'complete networks[5]. The second one defines social network from an ego-centred standpoint (Wellman, 2007a, b). An 'ego-centred' (or 'personal') network is defined as one actor's set of relations with others. It is composed of a focal actor (named ego), a set of ego's direct social contacts (named alters) and the ties between them (figure 1)[6]. This perspective is particularly appropriate to analyze actors' networks whose composition is diversified and not limited by some geographical, organizational or community boundaries. It is thus particularly relevant for the analysis of urban African informal entrepreneurs' networks, often composed of a mixture of business, friendship and kinship ties developed within several social circles. Instead of focusing on ties with some specific social category, entrepreneur's social network directly refers, in our approach, to its *regular social relations conveying useful resources for activities' current exploitation* (both tangible and intangible, economic and social)[7]. Such ego-centred networks can be described by three salient dimensions: network structure, content of ties, and members' attributes (figure 1). It allows to analyze and evaluate how different configurations of personal networks, with regard to the three dimensions, influence entrepreneurs' economic outcomes[8]. Before going into the matter of data and methods used to construct specific networks' indicators of each dimensions, we have to clarify how each dimension is articulated with economic outcomes, notably in small African entrepreneurship.

[4] Scott (2000) identifies three research traditions: Gestalt theory in psychology (sociometry's work of Moreno), sociology's works of Mayo and Warner in the 1930s at Harvard; and social anthropology of the Manchester school (Barnes, Mitchell). SNA is the synthesis of theses approaches. It emerged under the supervision of H. White at Harvard in the 1960s-1970s.

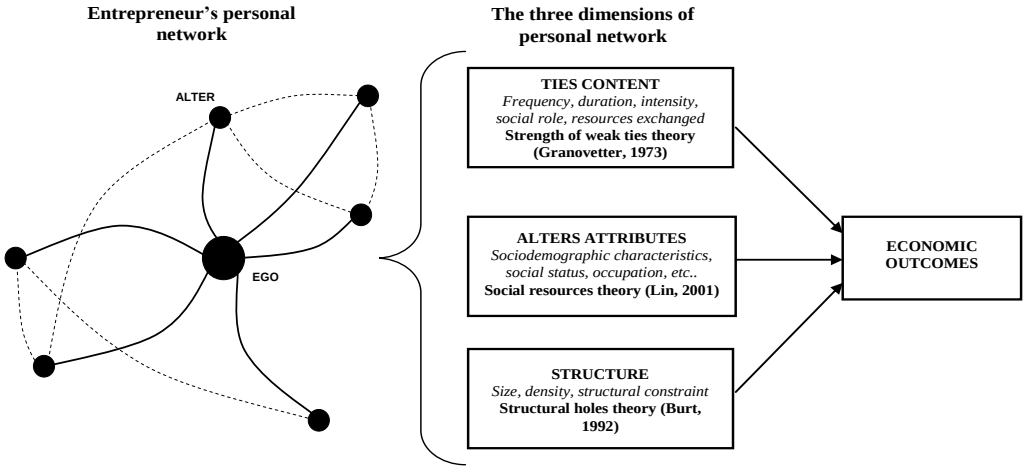
[5] This perspective aims at describing the structure of relations inside groups, clubs, organizations or other social finite sets. The problematics notably refer to centrality and power distribution inside these groups.

[6] Ego-centred networks emerged as an analytical tool with the works of social anthropologists of the Manchester School; notably concerning the structure of social relationships in urban areas of the Copperbelt in Africa (Mitchell, 1969). Their methods were essentially qualitative and based on observation's survey.

[7] These resources can be ideas, advices, information, capital, business partnership, 'bureaucratic goodwill' or administrative support, financial support in time of crisis or for investment, contact for recruitment, etc (see section 4).

[8] It is thus fairly different from social capital framework that aims at comparing entrepreneurs with different amounts of social network capital. Here, we do not deal with the 'amount' but with the 'configuration' of personal network. The question is not how many social relations you keep going, but what kind of relations you maintain and in which configuration.

Figure 1: Configurations of entrepreneur's personal network and economic outcomes



3. The three dimensions of ego-centred networks and their economic impact

Each dimension has been subject to several discussions and theories in the literature; we will here focus on the essential contributions cited in figure 1.

The strength of a tie is defined by Granovetter (1973: 1361) as 'a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie'. Importance of weak ties results from their bridge function[9]. Weak ties play a crucial role to access information, as in labour market (Granovetter, 1995). However, strength of ties' effect on economic activities is not univocal and may be contingent to the social context or to the type of resources exchanged (Granovetter, 1983; Krackhardt, 1992). Strong ties are more approachable and may insure a better quality in the transmission of resources. It could thus be useful for vulnerable actors. The empirical literature on small entrepreneurship in Sub-Saharan Africa confirms these two aspects. In her case studies in Guinea, Lourenço-Lindell (2002) stresses that if weak ties are more flexible and easily manipulated; they are also more vulnerable in time of crisis (conversely to strong and affective ties). In the case of agricultural traders in Madagascar, Fafchamps and Minten (1999, 2002) underline that weak ties, like non-kin relations, are determinant to access and share market information. But at the same time, they also underline the importance of strong ties in risk sharing or social insurance, so as for market relations with suppliers and customers (regular relations ensure secured supply and demand, reduce transaction costs, favour credit or delayed payment). The role of strong ties, notably kin relationships, in access to capital needed to start business has also been widely demonstrated.

Concerning alters' attributes dimension, it has been essentially studied under the frame of the social resources theory of Nan Lin (1999, 2001). Within a hierarchical view of social structure, he considers that the success of an action depends on two aspects: the presence of high social status contact in the personal network (which permits access to better quality and relevant resources) and the network's status diversity (which increases the probability of access to appropriate resources for any problem). The adaptation of this theory in African

[9] In a network, a bridge is a tie that provides the only path between two individuals or groups of individuals. The central hypothesis of Granovetter (1973) is that strong ties create closed networks whereas weak ties permits access to other social circles than actors' own direct network. In social capital literature it is referred as 'bridging social capital' as opposed to 'bonding social capital' (strong family and community ties) (Woolcock, 2001).

informal economy has not been much empirically analysed and tested. Some exceptions are Barr's (2002) study of Ghanaian manufacturing sector and Meagher's (2006) analysis of Nigerian clusters. They distinguish what they respectively call 'solidarity' or 'survival' networks from 'innovative' or 'accumulation' ones. Survival networks tend to be small, dense, locally concentrated and with poorly resourced personal relations (with no access to advantageous economic position or privileged commercial groups). It is very homogeneous in terms of members attributes. Though it reduces risks and incomes variability, it has little impact on economic performances and tends to undermine rather than enhance profits (Barr, 2002)[10]. Conversely, accumulation networks are wide, geographically dispersed, and much more diversified regarding members' status. They are composed of advantageous ties with privileged access to resources (ties with privileged social classes, civil associations and successful traders, notably international traders).

Barr and Meagher's typology allows to further with the last ego-centred network dimension. Indeed, the opposition between dense solidarity networks and open wide accumulation ones is one of the rare empirical insights into networks structure in African entrepreneurship. Relevant measures of networks structure are absent from most empirical surveys, if we consider that network's size is inadequate. This is precisely Burt's (1992) 'structural holes' argument. According to Burt (1992:17), what matters is not the number of contacts, but 'the numbers of non-redundant contacts'. 'Contacts are redundant to the extent that they lead to the same people, and so provide the same information benefits'. A structural hole is then the gap between non redundant contacts[11]. The more structural holes in actor's network, the more the returns in terms of information access and control (position of 'tertius gaudens'). However, Burt's argument has to be discussed as it is in sharp contradiction with other approaches to network structure. Coleman (1988), and to some extent Granovetter (1985), argue that dense and cohesive networks permit the emergence of collective norms and have thus a strong impact on actors' behaviour. Social control and pressure may limit treachery and favour trust and cooperation. Finally, structural holes effects on economic outcomes may be contingent to the social context and type of activities considered. For example, Fafchamps (2006) pointed out that the exclusion or collective punishment of cheaters is a difficult strategy to sustain in African entrepreneurship.

4. Data and measurement options

The data

The data have been collected in the informal economy of Bobo-Dioulasso in Burkina Faso. Burkina Faso is one of the poorest countries in the world. Real GNI per capita is estimated at US$ 430 in 2007 (World Bank, 2009). 46.4% of its population lives under poverty line (INSD, 2003). Thus, although Burkina Faso knew considerable economic growth since 1990 (more than 4% per year in average) it had to support a strong increase of urban poverty. This phenomenon, common in most West-African countries, has led informal economy to become a major source of earnings and livelihoods for urban population. In Burkina Faso, the importance of informal economy matches regional tendencies (Webster and Fidler, 1996; Gaufryau and Maldonado, 2001; Brillaud and al., 2004). In Bobo-Dioulasso, informal

[10] According to Barr (2002), these networks characterize small businesses located on the fringe of formal institutions (informal economy), whereas innovative networks are representative of enterprises with access to formal institutions.

[11] This strategic importance of the absence of relations in the network structure is in line with Granovetter's strength of weak ties argument.

economy represents 49.5% of local value added and 68.2% of employment (Fauré, Soulama, and al., 2000).

From February to July 2007 we have conducted a survey on a representative sample of 317 entrepreneurs[12]. Firstly, sociodemographic and economic data were collected concerning entrepreneurs features, type of activity, employment, economic capital and outcomes. Secondly, that statistical information has been completed few weeks later by collecting personal network data on a sub-sample of 278 entrepreneurs[13]. The survey focused on small urban private economic activities carried on apart from fixed homes. Only owners, or real managers of activities, have been interviewed[14]. The boundaries of the informal economy have been empirically defined according to three aspects: (i) administrative registration (commercial register, fiscal register, national social security fund); (ii) activity's size defined by the number of employees (with a five wage workers threshold); (iii) accountancy's type (quite formal, personal diaries, no accountancy). According to our definition, an informal activity is an activity that does not fall under the formal institutional framework for at least two of these selection criteria. The sample is representatively distributed by economic sectors (production, trade and services) and sub-sectors, and by geographical area, regarding the results of the last exhaustive census of economic activities carried out in Bobo-Dioulasso (Fauré, Soulama, and al., 2000). In practical terms, the respondents were mainly selected in an anonymous way by using a random walk technique through the city. Some were selected in dense activity locations (marketplaces, major roads) and other in more isolated places.

The multiple name generator instrument

Different instruments for collection of personal networks data are conceivable (Marsden, 2005, Wasserman et Faust, 1994). The name generators method is the most commonly used in the field of entrepreneurship. It is structured around individual questionnaires that can be easily integrated in traditional quantitative survey (Burt, 1984).

Name generators consist of one or several questions inviting respondent (ego) to recall and elicit peoples (alters) with whom he maintains certain types of direct relationships. They are usually followed by questions, called 'name interpreters', that gather information on alters' attributes, on the relationships between ego and each alter, and on the relationships between alters[15]. Name generators' purpose is obviously not to obtain the total number of alters existing in entrepreneurs' personal network, but to elicit a representative sample of them as to delineate the core members of the network (Marsden, 2005)[16]. Thus, in order to identify ego's relationships, several criteria can be used as a basis for the construction of the generators

[12] The whole field work has been grant-aided by the scientific and academic international mobility financial program of the AUF (Agence Universitaire de la Francophonie), and benefited the financial support of the GREThA (UMR CNRS 5113 - University of Bordeaux) and the partnership of CEDRES (University of Ouagadougou). We have also conducted, from April to June 2006, a pre-survey which has been used to construct and test questionnaires. Note that a complementary qualitative survey, based on 14 informal entrepreneurs' life histories has been implemented from May to July 2008 (results are not used here).

[13] We will not present the construction of the first questionnaire which is more commonly-used and strongly inspired from the phase two, devoted to informal sector, of 1-2-3 surveys (Amegashie and al., 2005). The first survey has been conducted by J.-P. Berrou and four interviewers. The second one, about social networks, has been conducted by J.-P. Berrou, with an interpreter.

[14] Those we call 'entrepreneurs', even if we agree that the use of this term in informal economy may be discussed.

[15] Thus, names generator instrument differs from connected instruments as 'position generators' (Lin, 2001) and 'resources generators' (Van der Gaag and Snijders, 2003). Both share the same weak point as it rest on the question 'Do you know anyone who is a/an…?' and thus rest on fragile criterion for relations identification.

[16] The objective is to give a real image of the differences between respondents' networks structure and characteristics.

(Campbell and Lee, 1991). Criteria of specific social exchange (persons involved in regular relations of material or intangible support) have the advantage of being clear and unequivocal, as it is less likely to be interpreted differently across respondents. Name generators method has already been implemented in studies of women's social support network in rural Africa. It has revealed a reasonable reliability, particularly in its capacity to delineate the core of personal networks (White and Watkins, 2000; Bignami-Van Assche, 2005; Adams and al., 2006). In the field of entrepreneurship, it has been commonly used in studies about industrialized societies (Greve and Salaff, 2003; Renzulli, Aldrich and Moody, 2000), but it remains rarely used in Sub-Saharan Africa.

Our instrument has been constructed after several tests in order to take account of different bias identified in the literature (as memory and cognitive bias). It is based on multiple names generators (Fischer, 1982; Burt, 1997). Eight name generators are used (see the detailed generators in box A1). They are defined on the basis of a criterion of interdependency or regular interaction of people involved in social relations conveying resources needed for informal activity's current exploitation (during the last twelve months). Seven types of exchanges, or resources, are used to construct the first seven generators: (i) advices, information and ideas (concerning markets, management, investment, partners); (ii) support in administrative or bureaucratic relationships (with local institutions, to obtain favours concerning tax payments, local placement or conflict resolution); (iii) regular suppliers (access to goods and raw materials); (iv) faithful customers; (v) cooperation or partnership (entrepreneurs who assist each other, sometimes pooling resources and contacts); (vi) financial support (in time of crisis for example); and (vii) contact for recruitment (access to employment). Lastly, a 'contextual name generator' (Bidart and Charbonneau, 2007) has been inserted. It refers to important support relations at the moment of business start-up (whether it is material, financial or advices supports) which are always active in entrepreneurs' network. So as to limit interviews' duration (average of 45-60 minutes), the number of alters cited for each generator was restricted to three (two for the second generator)[17]. Moreover, in addition to the eight generators, a final name eliciting question has been added for additional important contacts that may have been forgotten. Once the entire name list elicited (1964 names), it was asked respondents to characterize each relation from a social role standpoint (kin, friend, neighbour, business tie, acquaintance). Then, for a representative sub-sample of relations (1324), complementary name interpreters were focused on tie's content (duration, contact frequency, trust intensity, context of creation), alters' attributes (age, gender, ethnicity, schooling, occupation, status), and ties between alters (none, acquaintance, especially close)[18]. Name interpreters regarding alters' attributes only concern observable characteristics as it is better informed than alters' attitudes or opinions (Marsden, 2005). Data on ties between alters were collected through matrices crossing elicited names.

Measuring dimensions of ego-centred networks

The data collected during our survey divides in two datasets. The 'entrepreneurs dataset' (n = 317) is made of variables concerning entrepreneurs features and economic activities. The 'ties dataset' (n = 1324) concerns the data of the sub-sample collected through name generators and interpreters. Such data provides individual profiles of respondents' personal network members that can be aggregated into measures of entrepreneur's network

[17] It is quite important to consider that this constraint does not prevent from estimating the differences between individuals network's size.

[18] The sub-sample is made of the firsts quoted names at each generator, as Fischer (1982) proposed in his survey on personal network support in San Francisco.

configuration according to the three dimensions (ties' content, alters' attributes, network structure).

The content of social relations composing entrepreneurs' personal network can be divided in three salient dimensions: normative content or social role, transaction or exchange content and strength. Regarding the first two dimensions, the proportion of professional ties in network and that of ties conveying tangible resources have been considered[19]. More importantly, the strength of ties has to be examined. As such an issue is obviously multidimensional (see Granovetter's definition above and Marsden and Campbell, 1984), we need to compute an only quantitative measure inferred from available variables: tie's contact frequency, duration, intensity (or trust closeness) and reciprocity (or mutual aid). To do so, we use multiple correspondence analysis (MCA) to compute a succession of quantitative variables summing up our four initial categorical variables. As shown in table A.1 and figure A.2, the first principal component generated by MCA offers a trustworthy weighted combination of the initial variables. Thus, individuals' coordinates on this first component can be used to evaluate ties' strength. For clarity purpose, these coordinates have been transformed in an ordinal variable ranging from the weakest to the strongest tie in the sample[20].

Our analysis of alters' attributes in entrepreneurs' personal networks focuses on three different aspects. The first one is social status (Lin, 2001). Considering ego, we distinguish alters enjoying an *intermediate status* (business owners of the upper part of informal sector, formal small and medium-sized enterprises owners, and workers and non qualified employees of private formal and public sector) and alters enjoying an *higher status* than his (executives, managers and officers of private formal and public sector, intellectual and intermediary professions of private formal and public sector)[21]. Another side of alters social status is proxied by the average level of education of ego's relations. In order to avoid a restrictive view of alter's attributes we have also considered the socio-demographic similarity between ego and his alters (homophily, or its reverse, heterophily). This similarity is evaluated considering four socio-demographic characteristics (age, ethnicity, religion, and geographical location)[22]. In other words, this dimension reflects the socio-demographic opening of entrepreneurs' network. The last aspect concerns the professional occupations of network's members. It is appreciated through the diversity of alters' occupations, measured by the ratio between the number of distinct occupations among ego's relations and the total number of ties in its network. Lastly, regarding the opening of ego's relations onto other occupations than his, we consider the proportion of ties involving alters belonging to the same profession as ego.

Networks' structure and the idea of structural holes can be measured in different ways. A first simple measure is network's density (number of existing ties between alters divided by the total potential ties). More in-depth is Burt's famous measure of 'structural constraint', as it simultaneously expresses both size and density of personal network. It measures to what extent the overall relational investment of ego implies, directly or indirectly, a same alter. It is

[19] Among all resources potentially conveyed by social relations, tangible resources are suppliers, customers and cooperation ties, and financial and start-up support as opposed to advices and information, administrative support and recruitment ties (informational resources).

[20] Obviously, tie's strength must be considered in relation to the fact that we focus on the core members of entrepreneur's personal network.

[21] Consequently, alters enjoying a *lower status* than ego are informal employees and apprentices, small farmers, and non-working population; and those enjoying a *comparable status* are small scale entrepreneurs and regular employees of the informal sector.

[22] Ties are considered heterophilic when alters are similar to ego for at most one of these four characteristics.

computed as the sum of structural constraints exerted by each alters, which themselves depend on ego's relational investment and alters' connections[23]. Measures of the structural constraint for each respondent have been calculated with UCINET VI (Borgatti and al, 2002). It ranges from zero for wide networks of non redundant contacts to one for limited and tightly interconnected networks.

5. Empirical findings

Before we investigate the configuration of entrepreneurs' network and test its possible impact on economic performances, some brief statistical overview presents the main socio-demographic and economic characteristics of our sample (see table A.2).

Main features of the sample

In Bobo-Dioulasso as in most informal economies, the dominant form of business is self-employment. Entrepreneurs are relatively young (35.5 years in average) and their households are composed of 7.5 members in average. Only 26% of them have a higher level than primary education. These last are more represented in the sector of services and notably in catering activities. In the informal economy, training is essentially ensured through traditional on-the-job apprenticeship. Most of entrepreneurs followed a mainly informal route (from familial assistant to apprentice and then owner). The average duration of activities shows their relative youth (7.6 years in average), with some significant differences according to sectors of activities. In particular, production activities have a much higher average longevity (9.5 years) than others. Regarding legality, 11% of the enterprises are registered in an official commercial register (mostly trade activities). The localization of economic exchanges confirms the autarkical confining of informal activities, as it mainly concentrates in the perimeter of the city for both customers and suppliers. The measure of economic performances reveals that earnings are higher in trade and catering activities than in production and other services[24]. However, the production sector is the most important in terms of employment and wage distribution. Trade and production clearly dominate other sectors regarding the average value of economic capital.

Entrepreneurs' social networks typology

Cluster analysis is a multivariate procedure for detecting groupings in some data. More precisely, we use k-means cluster analysis[25] to identify homogeneous groups of entrepreneurs based on the whole selected characteristics describing networks' dimensions. The analysis suggests the existence of four homogenous clusters categorizing the different kinds of

[23] Considering C_{ij} the structural constraint of *j (alter)* for *i (ego)* and p_{ij} the weight of the tie between *i* and *j* in *i*'s network (if *i*'s network's size is *n*, $p_{ij} = \frac{1}{n}$); aggregated constraint is defined by Burt (1992:54-56) as:

$$C_i = \sum_j C_{ij} \; ; \; i \neq j \; ; \text{ with}$$

$$C_{ij} = \left(p_{ij} + \sum_q p_{iq} p_{qj} \right)^2 ; q \neq i, j$$

[24] Catering activities notably take advantage of the increase of the urban population and of changes in food behavior in urban areas. Due to successive crises, the weakening of purchasing power and the increase in oil product prices, more and more workers are forced to have lunch in restaurants (or 'maquis') at their workplace instead of having it at home.

[25] This method uses an algorithm that examines and reassigns, if appropriate, each observation in turn to a different cluster, in an attempt to simultaneously minimize within groups and maximize between groups variance. See Hartigan (1975).

networks supported by entrepreneurs. As all observations are classified in such procedure, the produced typology may be blurred by individuals whose network's profile is in fact not really distinct from the average one. To avoid such flaw, we create a fifth category that gathers entrepreneurs whose network is indistinct regarding the categories produced by cluster analysis[26]. In order to describe the produced typology, table 1 shows the average values of the whole ten classification variables for each category. Moreover, to facilitate the interpretation of results, table 2 shows the average values of some other relevant variables dealing with the entrepreneur, his activity and his network itself.

The last columns of tables 1 and 2 give some interesting general insights about the average nature of entrepreneur's personal network in the sample. The average size of entrepreneurs' network is of 7.1 members and structural constraint is moderate (average of .564) although more than a half of ties composing their networks are strong and created before activities' start-up. This is partly explained by the strong proportion of business ties in entrepreneurs' networks (average of 57.8%). Conversely, the proportion of kinship ties remains quite weak (average of 24.9%) compared to business and also sociability's ties (average of 51.6%)[27]. These results suggest that informal entrepreneurs in Bobo-Dioulasso are not completely embedded in 'bonding ties' (intra community and family ties). Moreover, about a half of all business ties are also described as sociability ties (labour colleagues and close friends especially) whereas only 9% of them are also described as kinship ties. So, when business relations are embedded in other social relationships (than the labour relationship itself), it is rarely in kinship ones. Unsurprisingly, most of networks' members enjoy the same or a lower status than the entrepreneur's one (average of 64.5%). As indistinct networks do not require specific comments, we will now focus on the four specific identified networks[28].

Network A is rather typical of informal entrepreneurs' *solidarity network* identified by Barr (2000) and Meagher (2006). It is essentially composed of strong kinship and sociability's ties and thus has the poorest proportion of business relations. For the same reason, ties are quite homophile and convey more intangible resources than in other networks, notably advices, information and support in administrative relationships[29]. Conversely regular suppliers and faithful customers' relationships remain rarer. In that kind of network, members are not very educated and mostly of the same status (or inferior) and profession as ego. One outstanding difference with Barr and Meagher work is that the structural constraint is not that strong but rather close to the average, as well as network's size. That result partly confirms the likely decoupling of inter-personal relationships, even within kinship communities, in an urban context of economic pressure (Marie, 1997; Meagher, 2006; Lourenço-Lindell, 2002). Finally, that kind of network is especially well represented among trade activities and seldom supported by entrepreneurs with high levels of education.

Network B can be called *linking network* in reference to 'linking social capital' (Woolcock, 2001)[30]. It is characterized by a strong proportion of high social status and highly educated relations, which are strongly heterophilic and widely extra-professional. It is thus a wide and little constraining network. Although the proportion of kinship ties is the lowest, business ties

[26] We therefore select the about 20 % of entrepreneurs whose euclidean distance to the average observation is the weakest.
[27] Note that each relation can possibly be classified in two social role categories (a parent who is also a client for example), which explains that the total percentage exceeds 100%.
[28] Note that indistinct networks are admittedly wide and few constraining, but not significantly distinct regarding ties' content and alters' attributes.
[29] See table A.3 for the detailed repartition of resources conveyed in each network.
[30] Linking social capital refers to ties connecting individuals to people or groups of people enjoying political or financial power.

Table 1 : Networks identification ; means of classification variables by cluster*

Classification variables	Clusters					
	A	B	C	D	Indistinct	All
Network's structure						
Structural constraint	.599	**.429**	**.486**	**.896**	**.489**	.564
Ties content						
Average strength of ties[1]	**58.4**	**43,1**	**38,4**	**54.7**	50.5	48.8
Proportion of professional ties	**.443**	.543	**.723**	**.636**	.559	.578
Proportion of tangible resources[2]	**.674**	**.687**	**.897**	**.835**	.732	.761
Alters attributes						
Proportion of intermediate status relations	.185	.203	.225	**.265**	.182	.209
Proportion of higher status relations	**.105**	**.343**	**.058**	**.089**	.111	.145
Average level of education[3]	**1.54**	**2.31**	**1.48**	**1.45**	1.71	1.72
Proportion of heterophilic ties	**.202**	**.525**	**.201**	**.167**	.233	.272
Proportion of intra-profession ties	**.355**	**.155**	.313	.326	.287	.284
Number of distinct occupations[4]	.423	**.521**	**.407**	**.521**	**.418**	.456
N	**54**	**58**	**54**	**44**	**60**	**270**

Notes : (*) Clusters have been identified using K-means cluster analysis – The values that significantly differ from those of other clusters (independent samples t-tests) are in bold type in the table – Entrepreneurs whose network shows no perceptible specificity have been gathered in the "indistinct" cluster ; (1) In the network of an entrepreneur, the strength of each tie is measured by an ordinal variable inferred from the coordinate of each tie on the first principal component generated by principal component analysis of the frequency, duration, intensity and reciprocity of ties ; (2) Among the resources conveyed by ties, tangible resources are suppliers, customers and cooperation ties, and financial and start-up support (3) This variable is computed on the basis of a five level scale of education; (4) This variable is computed as the number of distinct occupations among ego's relations divided by the total number of ties in ego's network.

Table 2 : Networks characterization ; means of characterization variables by cluster*

Characterization variables	Clusters					
	A	B	C	D	Indistinct	All
Network						
Size (number of ties)	7.0	**7.8**	6.9	**4.6**	**8.5**	7.1
Proportion of ties set up prior to activity's creation	**.640**	.557	**.499**	.585	.596	.575
Proportion of strong ties[1]	**.654**	**.427**	**.354**	**.617**	.530	.512
Multiplexity[2]	1.5	**1.3**	**1.6**	**1.7**	1.5	1.5
Proportion of same or lower status relations	**.711**	**.454**	**.717**	.646	**.707**	.645
Suppliers credit	.222	.310	.370	.227	.300	.289
Proportion of family ties	**.300**	**.185**	**.188**	**.343**	.251	.249
Proportion of sociability ties	.547	.546	.494	**.417**	.550	.516
Proportion of business-family ties[3]	0.13	**0.03**	**0.05**	**0.14**	0.11	0.09
Proportion of business-sociability ties[3]	0.56	0.48	0.52	0.47	0.54	0.51
Entrepreneur						
Native of Bobo-Dioulasso	.440	.410	.370	.390	**.600**	.450
Age	36.3	36.8	**32.8**	35.1	36.3	35.5
Gender[4]	.204	.155	.130	.182	.133	.159
Ethnic group[5]	.426	**.190**	.481	**.523**	.400	.396
No education	.425	**.224**	.296	.454	.383	.352
Primary education	.426	.397	.407	**.250**	.417	.385
Secondary education or more	**.148**	**.379**	.296	.295	.200	.263
Experience (years as owner of present activity)	7.5	**8.1**	**4.5**	6.2	7.5	6.8
Activity						
Located in the historic city centre	.590	.530	.480	.520	**.670**	.560
Length of activity's existence	7.9	8.3	**5.2**	7.7	8.7	7.6
Production	.278	.414	.278	**.159**	**.550**	.348
Trade	**.444**	**.121**	.333	**.523**	**.150**	.300
Catering	.111	.172	.111	.091	.117	.122
Other services	.167	.293	.278	.227	.183	.230
N	**54**	**58**	**54**	**44**	**60**	**270**

Notes: (*) The values that significantly differ from those of other clusters (independent samples t-tests) are in bold type in the table; (1) See table 1; strong ties are defined regarding frequency, duration, intensity and reciprocity; (2) Average number of resources conveyed by tie; (3) Proportion of ties simultaneously qualified of business and family ties (or business and sociability ties) among the total business ties (4) Binary variable; 0 = male and 1 = female ; (5) Binary variable ; 1 = Mossi and 0 = other ethnic groups.

are not significantly higher than in networks C and D. Ties are quite specialized (low multiplexity) and convey more intangible resources, like intermediaries for contact recruitment. Conversely, cooperation and partnership ties remain rarer than in other networks as so as start up support. This type of network is well developed among experienced entrepreneurs with high levels of education, but it remains quite rare in trade activities.

Network C may be described as a *flexible business network*. It is a medium-sized network, mostly composed of weak business ties and very few kinship relations, explaining its relatively low level of structural constraint. It mainly conveys tangible resources through regular suppliers and customers ties, partnerships and financial support. Yet, this network also exhibits a high proportion of suppliers credit relations, as well as multiplex relations. It is quite professionally homogenous and members enjoy, more often than not, the same status as ego. This type of network is particularly frequent among young entrepreneurs and relatively new activities.

Finally, network D presents very interesting features. As suggested above, the common solidarity network is not as dense as usually assumed. In fact, the smaller and most interconnected network, or the most structurally constraining, is the one we may call *dense business network*. Conversely to the flexible business network, this one rests on strong multiplex business and kinship ties. It mainly conveys tangible resources, notably through faithful customers' ties and start-up support (importance of kinships ties in start up), but also offers an appreciable part of advices and information. Network's members enjoy an intermediate status more than usual and cover a wide range of professions. Suppliers' credit relations are much less important than in the previous network. Such network is quite frequent among Mossi entrepreneurs and in trade activities.

Informal entrepreneur's ego-centred networks and their economic performances

We are now able to test the relevance of networks' configuration as a predictor of entrepreneurs' economic performances. Multiple linear regressions have been conducted to investigate how well inputs, business and entrepreneurs characteristics, but also especially networks' configuration predict performance indicators such as business turnover, earnings and profitability. The regressions coefficients give the change in performance indicators corresponding to a unit change in the appropriate explanatory variable, conditional on the other variables remaining constant. Thus, we can assess the impact of social networks on economic performance, whatever the value of other explanatory variables.

Regarding endogenous variables, monthly sales turnovers are expressed in francs CFA and adjusted for seasonal variations. Their logarithms are introduced in the model in order to smooth the impact of extreme values. Earnings are computed on a monthly basis as the difference between sales turnover and global monthly expenses, including raw materials and intermediate consumptions, current charges (of which wages and rents) and financial and administrative charges. They are also expressed in francs CFA and their logarithms are introduced in the model.

Two blocks of predictors have been implemented, that is to say usual predictor variables of informal business performances (inputs, business and entrepreneurs characteristics) and predictor variables featuring entrepreneurs' networks. With respect to the usual independent variables in the model, the following remarks can be made. Firstly, capital input is a monetary estimation of the actual value of the machinery, tools, equipment and stocks owned by entrepreneurs at the time of the survey. Labour input is measured by the monthly monetary value of wages paid to business employees, whatever their status. The effective contribution of labour to economic performances is then better appreciated, as the usual 'number of

Table 3: Hierarchical multiple regression analysis summary for variables predicting turnover and earnings (N = 270)

Outcome variables :	log (turnover)	log (earnings)
Predictors[1]		
Constant	3.170 (15.023)***	3.228 (12.619)***
Inputs		
Log (capital input)	.118 (3.330)***	.102 (2.357)**
Log (labour monthly input)[2]	.286 (7.479)***	.122 (2.630)***
Business characteristics		
Retail trade[3]	.557 (9.750)***	.255 (3.690)***
Catering[3]	.587 (7.607)***	.578 (6.171)***
Administratively registered activity[4]	.141 (1.846)*	.165 (1.780)*
Favourable economic situation[5]	0.137 (2.846)***	.210 (3.592)***
Entrepreneurs characteristics		
Primary education or more	-.003 (-.074)	.046 (.816)
Experience[6]	.075 (1.604)	.103 (1.800)*
Gender[7]	.015 (.206)	-.077 (-.900)
Ethnic group[8]	-.002 (-.042)	.005 (.081)
Professional organisation[9]	.142 (2.262)**	.178 (2.343)**
Networks configuration		
Solidarity network[10]	.103 (1.502)	.242 (2.911)***
Linking network[10]	.102 (1.507)	.074 (.893)
Flexible business network[10]	.076 (1.111)	.144 (1.732)*
Dense business network[10]	.140 (1.867)*	.134 (1.473)
Causality issues		
Network set up prior to activity's creation[11]	-.093 (-1.757)*	-.059 (-.916)
Network set up after activity's creation[12]	-.160 (-2.634)***	-.104 (-1.405)
F (sig)	18.168 (.000)	7.660 (.000)
R^2	0.551	0.341
Adjusted R^2	0.520	0.296
Durbin-Watson test (sig)	2.039 ($p < .01$)	1.896 ($p < .01$)

Notes : (1) Unstandardized estimated coefficients are shown, t tests are in brackets, ***p < .01, **p < .05, *p < .1 ; (2) for independent workers, log(labour monthly input) is standardized to 3.17 for continuity purpose ; (3) dummy variable, 0 = other activities ; (4) dummy variable ; (5) dummy variable, 1 = activities that have experienced a favourable economic situation this year ; (6) dummy variable, 1 = entrepreneurs conducting their business since at least 5 years ; (7) dummy variable, 1 = female ; (8) dummy variable, 1 = Mossi ; (9) dummy variable, 1 = members of one or several professional organisation ; (10) dummy variable, 0 = entrepreneurs whose network is indistinct ; (11) dummy variable, 1 = networks in which more than 2/3 of ties were set up prior to activity's creation ; (12) dummy variable, 1 = networks in which more than 2/3 of ties were set up after activity's creation.

employees' variable is likely to suffer serious productivity bias. For self-employed, the value of log (labour input), which should normally be - ∞, has been arbitrarily set to 3.17 in order to ensure the continuity of the variable. Secondly, business characteristics capture the impact on performances of carrying on retail trade or catering activity rather than another. It also considers the alleged positive impact of administrative registration and that of favourable economic situation during present year. Thirdly, entrepreneurs' characteristics bring together variables describing entrepreneurs' human capital (primary education and on-the-job experience), gender, ethnic group and professional organisation membership. The second block aims at introducing information about entrepreneurs' social networks as predictors of performances. Doing so, we will be able to test the impact of entrepreneurs' membership of some kind of network or other on performances, *ceteris paribus*. We therefore introduce four additional binary variables in the model, assessing the membership of entrepreneurs to one or the other of the previously determined network categories.

Yet, in that kind of econometric analysis, the direction of causality between networks' configuration and entrepreneurial success may be doubtful. Standard econometrics uses the method of instrumental variables to estimate causal relationships. It allows consistent estimation when the explanatory variables are correlated with the error terms, which may occur when the dependent variable causes at least one of the explanatory variables ('reverse' causality). In this situation, ordinary linear regression generally produces biased and inconsistent estimates. If an instrument is available, consistent estimates may still be obtained. An instrument is a variable that does not itself belong in the explanatory equation and is correlated with the endogenous explanatory variables, conditional on the other explanatory variables. Moreover, the instrument cannot be correlated with the error term in the explanatory equation, that is, the instrument cannot suffer from the same problem as the original predicting variable. In our case, suitable instruments are scarce and those who may be relevant, as for instance entrepreneurs' family's social background, are unavailable in the database. Therefore, we above all suggest to control for the actual impact of a possible « reverse » causality problem. If such causality exists and is significant, then economic performances partly explain the constitution of such or such type of network. In this case, performances of entrepreneurs whose network have been largely set up prior to activity's creation should be, all things being equal, significantly different from others… and it should be the same for entrepreneurs whose network have been largely set up after activity's creation. Thus, the introduction in the model of variables assessing the precedence or posteriority of network constitution regarding activity's creation is likely to control for possible 'reverse' causality.

The results of multiple regressions are shown in table 3[31]. Means and standard deviations are presented in table A.4, in appendix. Model (1) significantly predicts turnovers $F(17, 252) = 18.168$, $p < .01$, adjusted $R^2 = .551$; and model (2) significantly predicts earnings $F(17, 252) = 7.660$, $p < .01$, adjusted $R^2 = .296$. It appears that the introduction of the second block of variables significantly improves the quality of informal performances prediction above standards[32]. Thus, we demonstrate that entrepreneurs' social network configuration matters. This issue may be an important aspect of entrepreneurial success. However, it also appears that the different performance indicators are not affected in the same way by entrepreneur's membership in some network type or other. This stimulating result will now be discussed.

[31] The assumptions of linearity, normally distributed errors and uncorrelated errors were checked and met.
[32] See for example Kuegie, Nordman and Roubaud (2006), Gindling and Terrell (2005) or Funkhouser (1996).

6. Discussion and concluding remarks

The first important outcome of our paper is that *linking network* has no significant impact on entrepreneurs' economic performances in the informal economy of Bobo-Dioulasso. Such an issue is of particular interest as it is in sharp contradiction with the assumption that the presence of alters with privileged social status in ego's network ensure access to high quality resources and thus enhances economic outcomes; as suggested in the social resources theory (Lin, 2001) and some usual empirical results (Barr, 2002; Meagher, 2006). One explanation rests on the idea that resources possessed by privileged social classes are not that useful for entrepreneurs in the urban African informal economy (and more specifically in Bobo-Dioulasso). Resources conveyed by closer status individuals may be of greater utility. Indeed, it is for example especially relevant for administrative support. It is more useful for informal entrepreneurs to have relations with some field agents of the fiscal administration rather than with managers or executives. These last are in a position that strongly constraints their possibilities of action, contrary to the firsts. Another example rest on supplier relationships; the organisation and dynamics of private formal large firms are generally not adapted to those of informal activities. These last require a high degree of flexibility for their economic transactions because of the uncertainty that characterizes informal economy. It is thus easier to work with informal suppliers or small and medium-sized formal ones (the same kind of argument can be applied to partnership and cooperation relations). Moreover, considering the high uncertainty of the informal economy, approachability is of prior importance, as for example when instant access to financial support is required in time of crisis. Alters enjoying a high social status are too much socially distant which may lead to asymmetrical relations. As Lomnitz (1988:48) suggests: 'The symmetry of the relationship depends on social distance: the closer the social relation, the greater the *confianza* and consequently the balance of the exchange'. Relations with most powerful actors can lead to unequal relations of subordination and domination (Lomnitz, 1988; Lourenço-Lindell, 2002; Meagher, 2006). From a methodological standpoint, this result also highlights the relevance of multiple names generators instrument which is defined on a criterion of exchanged resources. Indeed, the use of instruments like position generators (Lin, 2001, Barr, 2002) that predefine useful social categories may take as experienced what has to be demonstrated.

The second key result of our investigation is that business ties and business networks matters in the informal economy of Bobo-Dioulasso, but not anyhow. Whereas *dense business networks* have a significant impact on sales, *flexible business networks* significantly improve earnings. Dense business networks, well represented among trade activities, are quite balanced network in term of access to resources (see table 2 and A.3). It nevertheless has an important proportion of ties with regular clients that may notably explain its impact on sales (as it ensures stable demand). It is also a small and tightly interconnected network (strong structural constraint) with an important part of kinship and business kinships ties. It is thus quite different from flexible business networks which conversely have a weak structural constraint and few kinship ties. This may explain why these last are more efficient regarding entrepreneurs' earnings. Indeed, following Burt's (1992) argument, informal entrepreneurs embedded in slightly constrained networks benefit from greater autonomy, control and freedom of action. For example, entrepreneurs' position in transaction negotiation and price fixing is all the more favourable as their various suppliers and customers are isolated from one another. A transaction is more difficult to negotiate when it is locked in other relations. Thus, the more structural holes in entrepreneur's network the more he earns from his resources. As flexible business networks are characterized by an important part of four crucial entrepreneurial resources (regular suppliers and customers, partnership, and financial support, even through credit-supplier), this effect may be extremely prominent. All the more since

these resources have a considerable impact on the reduction of transaction costs (it reduces search costs and the time spent to inspect product quality, it facilitates contract enforcement, and cooperation improves organization efficiency, etc.). Moreover, weak structural constraint improves entrepreneur's ability to seize market opportunities (advantage in terms of access to information). This is particularly valuable in instable and uncertain environments such as urban African informal markets. However, at the same time, that kind of network is probably more risky (high proportion of weak ties) which explain why it is well developed among young entrepreneurs and relatively recent activities.

The last important result is that *solidarity networks* have a significant impact on economic outcomes (earnings). This result challenges usual insights on solidarity networks often considered as reducing uncertainty but impeding performances (Barr, 2002). Whereas that kind of network includes less regular suppliers and customers ties, it shows a more appreciable proportion of advices, information and administrative support, and a moderate one of other resources. Thus, it highlights the importance of informational resources, notably administrative relationships, and social support in the informal economy (form of social insurance). Furthermore, approachability is a core characteristic of solidarity network, conversely to linking networks. Indeed, it is composed of an important part of strong kinship and sociability ties; and of the weakest proportion of business ties and high social status contacts. Then, approachability may be of prior importance for small informal entrepreneurs as it facilitate access to alters' resources. This type of network is thus more resilient in front of shocks. Another aspect of approachability is networks' homogeneity, notably regarding professional occupation. In discrepancy with social resources theory and Barr's (2002) conclusion, we find that social network homogeneity does not undermine informal earnings but rather improve it (flexible and dense business networks also appear to be quite socially homogeneous). We suggest that for the case under study, the professional diversification, as in linking networks, is not that useful. For informal entrepreneurs, network professional proximity and cohesion seem to be more important (ego knows each alter and its competences more precisely, what favours a more efficient circulation of resources). Inter-firm cooperation may also be a core determinant of firms' efficiency in the informal economy of Bobo-Dioulasso. The part played by professional homogeneity and complementarity in entrepreneurs' networks is supported by the significant and positive effect of the professional organisation membership dummy variable in the model. Lastly, solidarity networks also benefit from a moderate structural constraint that clearly differentiates it from dense business network and obviously increases the returns of informational resources. It can first be explained by the quite balanced proportion of business (44%), kinship (30%) and sociability ties (55%) in such networks compared to others (notably dense business networks which have the weakest proportion of sociability's ties, 41.7%). It may also highlight the likely decoupling of inter-personal relationships from their community framework. As observed by Marie (1997) in West-African cities, economic pressure tends to favour the emergence of new forms of social solidarities (even inside communities), more selective (even instrumental), more affinity-based and with a more contractual nature (role of sociability ties). All things considered, this result reveals the importance for small urban informal entrepreneurs to draw on both embedded social relations (strong or bonding ties) and autonomous ones (weak or bridging ties) (Granovetter, 1973, 1983; Woolcock, 1998), or the importance of coupling and decoupling (Granovetter, 2000). The second type of ties completes the benefits but also reduces the constraints of the firsts (approachability vs. social obligations and claims). Then, strong family ties do not appear to be a non-productive component of social networks, as suggested by Fafchamps and Minten (2002). It represents an appreciable part of solidarity and dense business networks that both have a significant impact on entrepreneurs' economic outcomes (notably in trade activities). From a methodological standpoint, such result confirms

the interest of reasoning in terms of networks' configuration simultaneously considering its three dimensions.

Finally, our results suggest some policy considerations. Given the high uncertainty and volatility of markets in Africa, and even more in the informal economy, it is not surprising that solidarity networks appear to be efficient for informal entrepreneurs' performances. Obviously, in such a context, small informal entrepreneurs try to limit their business' opening onto market conditions. However, this type of network composed of an important part of strong kinship and sociability ties can not easily be promoted through policy intervention. But our results also stress that business networks, notably flexible business networks, have a significant and positive impact on entrepreneurs' performances. The difference between flexible and dense business network, the last being strongly constraining, suggest the need for institutions that encourage and permit interaction between entrepreneurs outside traditional communities' constraints. In other words, policy intervention has to create the institutions that could favor the development of equitable market-based relationships and bridging ties (business and professional organizations, but also meeting places as market-places or trade fairs). Such institutions may uphold less risky, more attractive and more durable business ties. They may fulfill three important characteristics which ensure networks' efficiency for informal entrepreneurs: approachability (equitable linkages), professional cohesion and proximity, and moderate social constraint. Their construction should be based on pre-existing informal business ties. Consequently, specific network data have to be more frequently collected. For example, it may be fruitful to insert an ego-centred network item in 1-2-3 surveys (Amegashie and al., 2005). This item can be easily integrated in quantitative surveys through names generators instrument, as suggested long time ago by Burt (1984) for the General Social Survey in the United States. To conclude, note that both macro-economic and institutional context obviously remain of prior importance, as business relations are more easily materialized and maintained in a stable and trustful environment.

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Appendix

Box A.1. The names generators

1. Advices, informations and ideas
Usually, entrepreneurs know people they can ask some advices and information to, or with whom they can discuss and share some of their ideas and even some important issues concerning their business. For example ideas about how to improve and enlarge business, ideas about investment and management, or informations about markets, suppliers, customers, access to credit, and so on. During the last 12 months, is there any people you have asked advices or information to, or with whom you shared ideas concerning your current business? Please name up to three people with whom you have especially discussed about that kind of things.

2. Support in administrative or bureaucratic relationships
Within the framework of their business, small entrepreneurs often face some administrative obligations and problems. They have relations with the public authorities, the municipality (Bobo-Dioulasso central town council or town hall of arrondissement), the specialized organizations (as the chamber of commerce, professional associations, labour unions), the tax office, the police, and so on, for example concerning controls and inspections for the payment of taxes, the constitution of files to access public markets, the location of businesses…Generally speaking, in your current business, is there some people you rely on to settle that kind of problems concerning administrative burdens ? Please name up to two of these people.

3. Regular suppliers (access to goods and raw materials)
Within the framework of your business, regarding the purchase of goods, raw materials and equipments that are essential to your activity's exploitation, do you have personal contacts through which you access suppliers or suppliers with whom you maintained regular relations during the last 12 months? Please name up to three of these people.

4. Faithful customers or access to customers
Concerning customers, did you have, during the last 12 months, personal contacts which allow you to regularly reach them, to improve your reputation, or do you have "faithful customers" who regularly purchase your goods and/or allow you to reach good markets? Please name up to three of these people.

5. Cooperation or partnership with other entrepreneurs
Within the framework of their current activity, small entrepreneurs often develop some relations of mutual aid, partnership or cooperation with other entrepreneurs. As for example in the case of breakdowns, or when you do not have the appropriate tool, machine or good; and even when you cooperate in the process of production, the share of markets or the exchange of customers. Who are the entrepreneurs with whom you maintained such kind of relations? Please name up to three of these entrepreneurs with whom you personally and regularly cooperated during the last 12 months.

6. Financial support
In their current business, small entrepreneurs may face some financial difficulties causing problems to maintain the business and even threatening the activity with closure. Did you recently, during the last year for example, experience some financial difficulties, cash flow problems, or important breakdowns? If yes, how did you overcome such kind of situation? Did you ever asked for financial support to anybody? In addition, some entrepreneurs may decide to invest in new equipments in order to develop their business and workshop, or to replace their machines. Did you ever received financial support for that kind of investment? Finally, when you face that kind of problems, who do you rely on for financial support or help to reach for financing (whether it is gifts, loans or advances)? Please name up to three people to which you regularly asked for financial support during the last 12 months.

7. Access to employment (contact for recruitment)
Do you have employees, permanent or occasional, wage workers, familial assistant or apprentices? Concerning those hired during the last year, were there personal contacts which served as intermediaries for their recruitment? For example you may have hired them through a family member, a neighbour, a friend, a customer, and so on. Who are these personal regular contacts which have served as intermediaries for your recruitments, or by whom you would pass to recruit somebody for your activity? Please name up to three of these contacts.

8. Support for business start-up
At the time of your business start-up, did some people support you in such a manner that you consider them as very important for you during this period? If yes, how did they support you? Moral support, financial or material help? For example, how did you constitute your start-up capital? Among these people, with whom you still have been in regular contact during the last 12 months, please name up to three.

9. Opened question
Looking at the entire name list you have quoted, are there other people who you consider as very important for you in your activity's current exploitation and who do not appear on the list? If yes, how many people did we forget? Please name one of them.

Table A.1: MCA components contributions – Strength of ties variables

Variables *(categories)*	**F_1**	**F_2**	**F_3**	**F_4**
Frequency *(daily, one or several times a week, less than once a week)*	0,103	0,074	0,103	0,074
Durability *(< 2 years. 2-5 years. 5-15 years. 15-30 years. 30 + years)*	0,362	0,390	0,362	0,390
Intensity *(weak. intermediate. strong)*	0,396	0,508	0,396	0,508
Reciprocity *(yes. no)*	0,139	0,028	0,139	0,028
Adjusted inertia	0,045	0,001	0,001	0,000
Adjusted inertia (%)	74,895	2,195	1,111	0,105
Cumulative %	74,895	77,090	78,201	78,306

Figure A.2: MCA plot of strength of ties variables categories

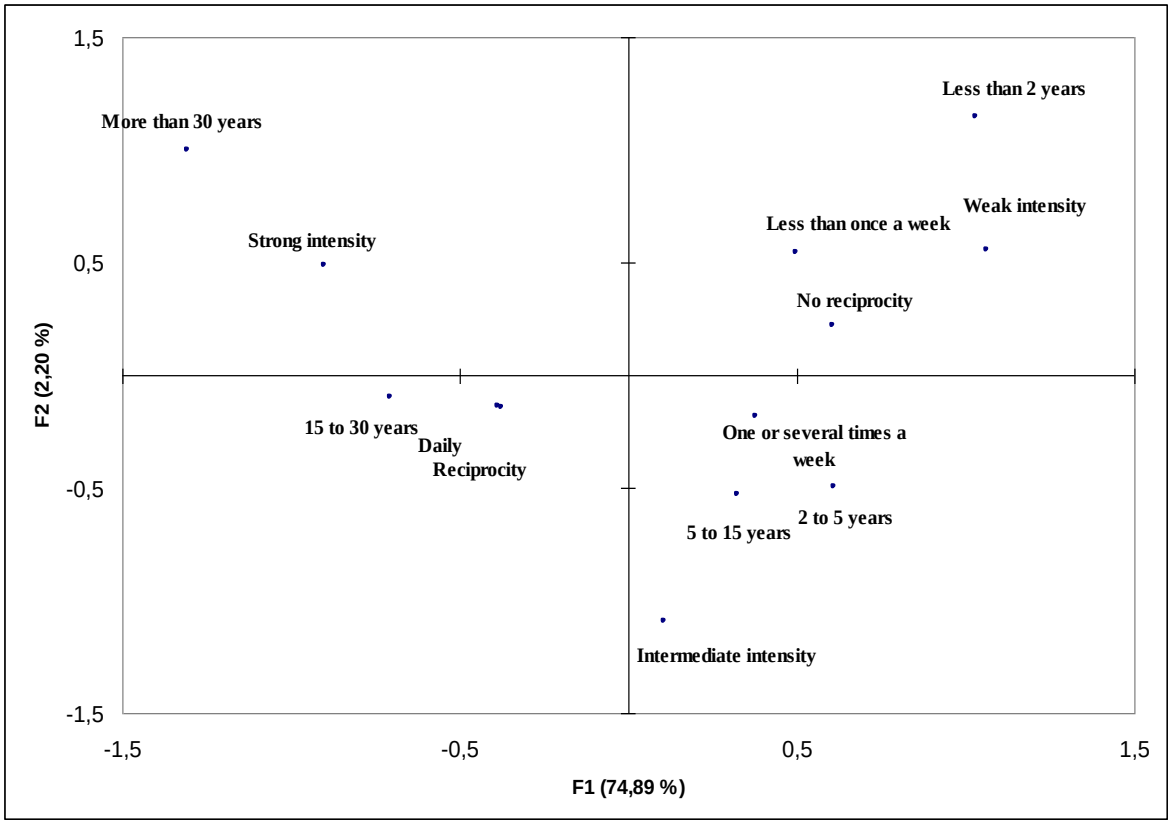

Table A.2: Average principal characteristics of activities and entrepreneurs by sectors. (N=270; Bobo-Dioulasso, 2007)

	Sectors of activities				
	Production	**Trade**	**Catering**	**Other services**	**Total**
Activities' Characteristics					
Monthly balance of primary incomes (K	60	107	171	50	**85**
Monthly wage bill (K FCFA)	45	11	34	20	**28**
Capital at resale price (K FCFA)	579	680	332	326	**521**
Activities' duration (years)	9,5	7,5	5,1	6,3	**7,6**
Commercial registration (%)	7	21	0	10	**11**
Entrepreneurs' Characteristics					
Age (years)	37,5	34,2	37,1	33,4	**35,5**
Household size (numbers of individuals)	8,5	7,8	6,9	6,0	**7,5**
Higher level than primary school (%)	14	23	42	34	**26**

Table A.3 : Networks exchange content ; proportion of each resource by cluster*

Resources	**Clusters**					
	A	**B**	**C**	**D**	**Indistinct**	**All**
Advices, information and ideas	**.307**	**.216**	.240	**.328**	.273	.270
Support in administrative relationship	**.136**	.106	**.078**	.100	.113	.107
Regular suppliers	**.099**	.162	**.214**	.174	.177	.165
Faithful customers	**.191**	.219	**.280**	**.292**	**.194**	.232
Cooperation or partnership	.158	**.108**	**.195**	.159	**.190**	.162
Financial support	.233	.208	**.256**	.229	**.185**	.221
Contact for recruitment	.136	**.153**	**.087**	.123	.148	.130
Start-up support	.195	**.163**	.227	**.263**	.189	.204

Notes: (*) The values that significantly differ from those of other clusters (independent samples t-tests) are in bold type in the table; Sums exceed 1, as many ties simultaneously convey several resources.

Table A.4: Means and standard deviations for performance indicators and predictor variables

Variables	**Mean**	**S.D.**
Sales turnover (thousands FCFA)	402	660
Monthly earnings (thousands FCFA)	85	116
Inputs		
Log (capital input)	5.269	.740
Log (labour monthly input)	3.997	.676
Business characteristics		
Retail trade	.300	.459
Catering	.122	.328
Administratively registered activity	.110	.315
Activity has experienced a favourable economic situation this year	.318	.467
Entrepreneurs characteristics		
Primary education or more	.648	.478
Conducting this business at least since 5 years	.537	.499
Gender (female)	.159	.357
Ethnic group (Mossi)	.396	.490
Membership of one or several professional organisation	.160	.363
Networks' configuration		
Solidarity network	.200	.401
Linking network	.215	.411
Flexible business network	.200	.401
Dense business network	.163	.370
Causality issues		
Network set up prior to activity's creation	.459	.499
Network set up after activity's creation	.230	.421